

THE ROLE OF MATHEMATICS IN SECONDARY SCHOOLS

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Abstract

Since mathematics is one of the core subjects in both Junior and Secondary School levels, it should be given utmost attention by both teachers and students. The paper examines the role of mathematics in our secondary schools since it is the foundation level of what a child will be in future or what profession a child wants to go into in future. The paper also points out the importance of mathematics in our secondary schools and also the problem of teaching and learning of the subject in our secondary schools. Recommendations were made based on the problems enumerated.

Introduction

Mathematics as one of the core subjects in both the junior and senior secondary school curricula in Nigeria has long become the basic tool of science and technology. In recent years, mathematics methods of investigation have made deep ways to such fields of knowledge as physics, chemistry, biology, economics, geology, agricultural science, linguistics, medicine, teaching, philosophy, archeology, law, military affairs and many others.

Gimba (2003) asserted that mathematics plays an important role in the understanding of the foundations and structure of knowledge in science. Also, mathematics helps the understanding of interrelationships between disciplines like chemistry, physics and others. It is a well-known fact that mathematics of the present generation is a set of highly sophisticated intellectual activities. It is therefore very difficult to define, considering various categories of audience. If we consider mathematics as a science of numbers and magnitudes (Musa, 2006), clearly defined Mathematics as an abstract science, which investigates (deductively) the conclusions implicit in the elementary concepts of partial and numerical relations (Hornby, 1995). One could still see that this definition did not encompass all that mathematics is. It is also not an adequate description of mathematics to say that it is a study of relationships among quantities, magnitudes, properties and logical operations by which unknown quantities, magnitudes and properties could be deduced (Berggen, 2001).

In view of the above definition, the researcher sees mathematics as a necessary tool for both scientists and technologists to carry out their work successfully. In fact, there is hardly any profession or vocation where the knowledge of mathematics is not being used. The builders of houses, bricklayers and carpenters want to know when the walls are straight and when they are at right angles. The engineers, scientists, doctors and other professions also use mathematics in the practice of their profession. In fact, without mathematics, the much-talked-about technological advancement for any nation will be an unrealistic dream. Therefore, it is important to see that students have a good foundation of mathematics from primary to secondary school level.

According to National Policy on Education (2004), the goal of secondary education shall be to prepare individuals for useful living within the society and higher education, to provide trained manpower in the applied science, technology and commerce at sub-professional grades.

Objective

The purpose of this paper is to outline the role of mathematics in secondary schools and also why mathematics should be given utmost attention by both teachers and students.

The need for mathematics in secondary schools

Mathematics is a highly structured subject in which various concepts and techniques depend upon. Therefore, the concepts of all disciplines in which mathematics is used as a

tool requires a thorough understanding of basic generations with numbers. According to Uwandiegu and Ejike in Gimba (2003) the preparation of student for university mathematics starts at the kindergarten. This is where recognition of steps which is the beginning of geometry and counting of natural numbers 1, 2, 3,are learnt.

The knowledge of basic mathematics is inevitable. For instance, in business, buying and selling, banking and financing, manufacturing and so on, the importance of mathematics cannot be over-emphasized. Tijjani (2001) summarized this by saying a thorough knowledge of mathematics will help to;

- (i). produce citizens that can manufacture raw materials, machines and tools needed for our industries,
- (ii). produce enough food for local and international market through mechanized agriculture by having good mathematics ability to make weather forecast and other agricultural calculations,
- (iii). invest new design, discover drugs capable of curing diseases as in pharmacy which make use of the knowledge of chemistry and biology.

When mathematics is taken serious and well taught in our secondary schools that will eventually transform the nation from a consuming one to a productive, self-sufficient and self-reliant nation. Ojerinde in Adeniran (2006) stated the national objectives of mathematics in the secondary school as

- (i). preparation of a child for higher education,
- (ii). generation of interest in mathematics and provision of solid foundation for everyday living,
- (iii). development of computational skills,
- (iv). fostering the desire and ability to be accurate to a degree relevant to the problems at hand,
- (v). development of precise logical and abstract thinking,
- (vi). stimulating and encouraging creativity,
- (vii). development of ability to recognize problems and solve problems with related mathematics knowledge.

Adeniran (2003) also identified the following goals that mathematics seek to advance; if mathematics concept is well taught in secondary schools.

- * Helping the child to explore and understands the world around him by developing competency and understanding the basic skills for dealing with numbers and shapes.
- * Helping the child to be able to compare and contrast objects quantitatively thereby develop the habit of effective thinking
- * Helping the child to communicate his thought through symbolic expressions and graph
- * Helping the child to develop the ability to distinguish between relevant and irrelevant data.

Mathematics is very useful to all professions. Basically, all professions require the use of mathematics in order to function correctly. Base on these several postulations were advanced by Musa (2002) regarding mathematics and its end users thus:

- * without mathematics, facts of a scientist will forever remain false.
- * without mathematics, a banker will forever remain a bankrupt.
- * without mathematics, a politician will forever remain foolish.
- * without mathematics, a farmer will forever remain with famine.
- * without mathematics, a soldier will forever remain with soldier.
- * without mathematics, a computer scientist will forever remain confused.
- * without mathematics, a medical doctor will forever remain deaden.
- * without mathematics, a lawyer will forever remain liar.

* without mathematics, a linguist will forever remain a languisher.

From these postulations, it is clear that mathematics is an essential tool to almost all human endeavour. Therefore, more emphasis has to be laid in the teaching and learning of mathematics in our secondary school system in order to achieve its aims and objective.

How students learn mathematics in secondary schools

The socio-constructivism and behaviourism views on the teaching and learning mathematics can be depicted as two contrasting views and both have influenced the way mathematics is being taught in schools. (Marland, 1994). Socio-constructivism as opposed to the behaviourist models of teaching and learning claims that knowledge should not be transferred from one individual to another in educational environment rather knowledge must be actively constructed as the learner is an entity with previous experiences that must be considered as a "knowing being". Learning is therefore seen as an adoptive and experiential process rather than knowledge transference activity (Candy, 1991). As learners encounter new situations, they look for similarities and differences against their own cognitive schematic or cognitive perturbations wanting to be resolved through reorganizing schemes of knowledge. (Phillip, 1995).

Learning mathematics depends on the way each individual learner looks at a particular situation and draws his/her own conclusions. Murphy (1997) gives recognition and value instructional strategies which students are able to learn mathematics by personally and socially constructing knowledge. These strategies include more reflective oriented learning activities in mathematics education such as exploration and generative learning. The activities include problem solving, practice, group learning discussions and situated learning. The advantage of this cannot be over-looked in order to achieve positive result, but most of the student in our secondary schools do not care to do all these. Good habits comes through hard work and it makes student progress in their mathematical work. Knowing the fact and processes they would be able to devote their minds to trail ideals, for instance, where students start to solve simultaneous equation, they should be able to know and get familiar with various variables both known and unknown without having to stop and think about them.

Why students find Mathematics difficult?

Mathematics as the most perfect of all sciences (Lakatus, 1986), the mother of sciences (Mura, 1995), the queen of sciences (McGinnis, Randy, Shaman, McDuffie, Huntley, King and Watanabe, 1996), a science in its own right (Mura, 1995), has undergone series of problems on how it is being taught in schools. Ali in Mura (1995) indicates that the teachers operate almost at the same level as the students they teach. They lack sufficient knowledge of the mathematical principles and thought method required for teaching the secondary school students. The resultant effect is that the subject is either neglected or poorly taught and the performance of the students continue to disintegrate.

Most teachers in the schools system often teach the mathematical sciences by the "telling method". This involves making lesson notes, passing on the information to the students and then evaluating the students. The teacher becomes very "active" while the students are very "passive". These does not lead to a lasting learning on the part of the students. Students do not easily understand and comprehend the lessons taught. This makes students to forget the lessons taught and therefore perform poorly in examination.

Active learning is a process whereby learners are actively engaged in the learning process rather than "passively" absorb lectures. Active learning involves reading, writing, synthesis and evaluation. It also involves students in doing things and thinking about the things they are doing (Bonwell and Elson, 1991).

Practical work provides the most effective means by which understanding of mathematics and science can develop when a subject is presented as a mass of sheer facts, students are unable to form patterns and establish meaningful relations among the stimuli, or link them with their own past experiences. The result is a distorted concept formation and a distressing tendency. In order to avoid this a child must practicalize a concept or participate in the learning process. Teaching is far more transmitting facts and information, for it is said that,

- A poor teacher tells
- An average teacher informs
- A good teacher teaches
- An excellent teacher inspires (Ukeje in Azuka, 2006)

Active learning implore the strategies where the students see, touch, feel, participate, discover, reason, deduce and infer facts and ideas in the learning process. A student will meet and have to answer all sorts of questions, some of which includes numbers, which are often spoken, written or printed. Thus, we need not only knowledge of numbers and simple mathematics facts and processes but we need to understand how to change the words of a problem into the right figures which always become one of the most difficult aspect to most students.

Conclusion

From the foregoing, it is apparent that mathematics is the key to both science and technology. Practically, all careers and professions requires basic knowledge of mathematics as a prerequisite; for example, engineering, computer science and technology, medicine, pharmacy, economics, banking, marketing and so on. Apart from careers that rely on mathematics directly, the subject mathematics is heavily relied upon in every day living. Everybody needs it, hence at every level of education mathematics is much needed. In the comprehension of other related subjects in secondary school level mathematics is the queen of all subjects, therefore adequate consideration should be given to the subject for the betterment of our future generation.

Recommendations

1. The government should make relevant materials like textbooks, mathematical set, graph books, calculators, computer and so on available in all secondary schools.
2. The attitude of mathematics teachers towards the subject should be positive in order to have an effective learning of the subject.
3. Teachers should provide adequate and well distributed drills and practices to make the learning permanent.
4. parents should provide their children with necessary materials needed for effective learning.
5. Secondary schools should have mathematics laboratory where students can go and do some practical aspect of mathematics on their own.

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